

ALC1248G

ADSL2/2+ Line Card

User's Guide

Version 3.90

3/2008

Edition 1



About This User's Guide

Intended Audience

This manual is intended for users of the ALC1248G ADSL2/2+ Line Card. It describes detailed information about the cards' features and hardware.

Related Documentation

- IES-5000 and IES-6000 User's Guides
Refer to the IES-5000 or the IES-6000 User's Guide for directions on installation, connections, maintenance, hardware trouble shooting and safety warnings.
- MSC1000G and MSC1024G Management Switch Card User's Guides
These user's guides cover the configuration of your IES-5000 or IES-6000. Refer to these user's guides for information on your ALC's default settings.
- ZyXEL Web Site
Please refer to www.zyxel.com for additional support documentation and product certifications.

User Guide Feedback

Help us help you. Send all User Guide-related comments, questions or suggestions for improvement to the following address, or use e-mail instead. Thank you!

The Technical Writing Team,
ZyXEL Communications Corp.,
6 Innovation Road II,
Science-Based Industrial Park,
Hsinchu, 300, Taiwan.
E-mail: techwriters@zyxel.com.tw

Document Conventions

Warnings and Notes

These are how warnings and notes are shown in this User's Guide.



Warnings tell you about things that could harm you or your device.



Notes tell you other important information (for example, other things you may need to configure or helpful tips) or recommendations.

Syntax Conventions

- The ALC1248G may be referred to as the “ALC”, the “device” or the “system” in this User's Guide.
- The “ALC1248G”, the “ALC” and the “line card” refer to the ALC1248G-51 for ADSL over POTS (Annex A). They also refer to the ALC1248G-53 for ADSL over ISDN (Annex B). Differentiation is made where needed.
- “IES” refers to the IES-5000 or IES-6000 system, including the main chassis and all associated cards.
- “MSC” refers to the MSC1000G or MSC1024G management switch card.
- Product labels, screen names, field labels and field choices are all in **bold** font.
- A key stroke is denoted by square brackets and uppercase text, for example, [ENTER] means the “enter” or “return” key on your keyboard.
- “Enter” means for you to type one or more characters and then press the [ENTER] key. “Select” or “choose” means for you to use one of the predefined choices.
- A right angle bracket (>) within a screen name denotes a mouse click. For example, **Maintenance > Log > Log Setting** means you first click **Maintenance** in the navigation panel, then the **Log** sub menu and finally the **Log Setting** tab to get to that screen.
- Units of measurement may denote the “metric” value or the “scientific” value. For example, “k” for kilo may denote “1000” or “1024”, “M” for mega may denote “1000000” or “1048576” and so on.

Safety Warnings



For your safety, be sure to read and follow all warning notices and instructions.

- Do NOT use this product near water, for example, in a wet basement or near a swimming pool.
- Do NOT expose your device to dampness, dust or corrosive liquids.
- Do NOT store things on the device.
- Do NOT install, use, or service this device during a thunderstorm. There is a remote risk of electric shock from lightning.
- Connect ONLY suitable accessories to the device.
- Do NOT open the device or unit. Opening or removing covers can expose you to dangerous high voltage points or other risks. ONLY qualified service personnel should service or disassemble this device. Please contact your vendor for further information.
- Make sure to connect the cables to the correct ports.
- Place connecting cables carefully so that no one will step on them or stumble over them.
- Always disconnect all cables from this device before servicing or disassembling.
- Do not use the device outside, and make sure all the connections are indoors. There is a remote risk of electric shock from lightning.
- Do NOT obstruct the device ventilation slots, as insufficient airflow may harm your device.
- Warning! To avoid risk of electric shock, remove only one card at a time and do not place fingers or objects inside the chassis. Cover empty slots with slot covers.

This product is recyclable. Dispose of it properly.

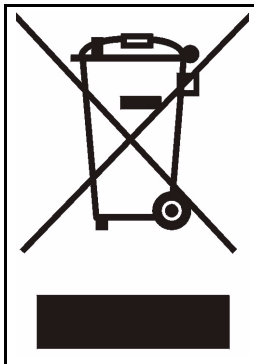


Table of Contents

About This User's Guide	3
Document Conventions.....	4
Safety Warnings.....	5
Table of Contents.....	7
List of Figures	9
List of Tables.....	11
Chapter 1	
Introducing the ALC1248G.....	13
1.1 ALC1248G Overview	13
1.2 ADSL Standards Overview	13
1.3 Features	14
1.4 Front Panel	18
1.5 Ports and LEDs	18
1.5.1 Ports	18
1.5.2 LEDs	19
1.6 Default Settings	19
Chapter 2	
Product Specifications	21
2.1 Product Specifications	21
2.2 Firmware Naming Conventions	23
2.3 Telco-50 Connector Pin Assignments	24
2.4 Wire Gauge Specifications	27
2.5 Console Cable Pin Assignments	27
Chapter 3	
Troubleshooting.....	29
3.1 Power and LEDs	29
3.2 DSL Data Transmission	30
3.3 Local Server	30
3.4 Data Rate	31
3.5 Management and Configuration	31
3.5.1 Uploading the Default Configuration File via Boot Commands	32
3.5.2 Uploading the Firmware via Boot Commands	33

Appendix A Legal Information	35
Appendix B Customer Support.....	39
Index.....	45

List of Figures

Figure 1 Front Panel	18
Figure 2 ALC Ports 1-24 Telco-50 Connector Pin Assignments	24
Figure 3 ALC Ports 25-48 Telco-50 Connector Pin Assignments	24
Figure 4 IES-5000/5005 Cable Telco-50 Pin Assignments (ALC End)	25
Figure 5 IES-5000/5005 Cable Telco-50 Pin Assignments (Splitter Card End)	26
Figure 6 IES-6000 Cable Telco-50 Pin Assignments (ALC End)	26
Figure 7 IES-6000 Cable Telco-50 Pin Assignments (Splitter Card End)	27
Figure 8 Console Cable Mini RJ-11 Male Connector	28
Figure 9 Example Xmodem Upload	32
Figure 10 Example Xmodem Upload	34

List of Tables

Table 1 ADSL Standards Maximum Transfer Rates	13
Table 2 Front Panel Ports	18
Table 3 LED Descriptions	19
Table 4 Device Specifications	21
Table 5 Supported Standards	22
Table 6 ALC Telco-50 Connector Pin Assignments	24
Table 7 Wire Gauge Specifications	27
Table 8 Console Cable Connector Pin Assignments	28
Table 9 SYS LED Troubleshooting	29
Table 10 ALM LED Troubleshooting	30
Table 11 DSL Data Transmission Troubleshooting	30
Table 12 Local Server Troubleshooting	31
Table 13 SYNC-rate Troubleshooting	31

Introducing the ALC1248G

This chapter introduces the ADSL2/2+ line card's general features, factory default settings and hardware.

1.1 ALC1248G Overview

The ALC1248G ADSL2/2+ Line Card is perfect for ISPs or large building applications seeking to provide high bandwidth broadband services to subscribers while minimizing costs. One ALC provides ADSL service for 48 subscribers over existing telephone wiring, thus avoiding the cost and hassle of installing new wiring.

The line from the user carries both the ADSL and the voice signals. For each line, the splitter card separates the high frequency ADSL signal from the voice band signal and feeds the ADSL signal to the line card, while the voice band signal is diverted to the central office switch or PBX (Private Branch Exchange).

Use the Telco-50 connector pin assignments in [Section 2.3 on page 24](#) along with the directions and safety warnings in the IES User's Guide to install the line card and make the necessary connections.

See the MSC User's Guide for detailed information on configuring the line card.

1.2 ADSL Standards Overview

These are the ADSL standards and rates that the ADSL line card supports at the time of writing. The actual transfer rates will vary depending on what the subscriber's device supports, the line conditions and the connection distance.

Table 1 ADSL Standards Maximum Transfer Rates

STANDARD	MAXIMUM DOWNSTREAM	MAXIMUM UPSTREAM
G.dmt	8160 Kbps	1024 Kbps
ANSI T1.413 issue 2	8160 Kbps	1024 Kbps
G-lite	1536 Kbps	512 Kbps
ADSL2	12000 Kbps	1200 Kbps
ADSL2 Annex M	12000 Kbps	2400 Kbps
ADSL2+	25000 Kbps	1200 Kbps
ADSL2+ Annex M	25000 Kbps	2400 Kbps

1.3 Features

Here is a partial list of the ALC's features.

ADSL Compliance

- Multi-Mode ADSL Standard
 - DMT T1.413, issue 2
 - G.DMT (ITU G.992.1) Annex A
 - G.DMT (ITU G.992.1) Annex B
 - GLITE (ITU G.992.2)
- ADSL2
 - G.992.3 Annex A
 - G.992.3 Annex B
 - G.992.3 Annex L
 - G.992.3 Annex M
- ADSL2+
 - G.992.5 Annex A
 - G.992.5 Annex B
 - G.992.5 Annex M

IEEE 802.1p Priority

The system uses IEEE 802.1p priority to assign priority levels to individual PVCs. The system can also handle multiple IEEE 802.1p priority queues on a single PVC.

System Monitoring

- System status (link status, rates, statistics counters)
- Temperatures, voltage reports and alarms.

System Error Logging

The ALC's system error log will record error logs locally. These logs may be viewed again after a warm restart.

Configurable Alarms

The system allows you to customize the priority levels of individual alarms and the alarm severity threshold for recording alarms on an individual port(s).

Alarm LED

An **ALM** (alarm) LED lights when the ALC is overheated, the voltage readings are outside the tolerance levels, a fan fails, or another alarm with a severity level of MAJOR or CRITICAL occurs.

IEEE 802.1Q Tagged VLAN

Your ALC uses the IEEE 802.1Q Tagged VLAN (Virtual Local Area Network), which allows it to deliver tagged/untagged frames to and from its ports. The IES supports up to 4094 individual VLANs.

Multicast VLAN

Multicast VLAN is designed for applications (such as Media-on-Demand (MoD)) using multicast traffic across an Ethernet ring-based service provider network. Multicast VLAN allows one single multicast VLAN to be shared among different subscriber VLANs on the network. This improves bandwidth utilization by reducing multicast traffic in the subscriber VLANs and simplifies multicast group management.

IEEE 802.1x Port-based Authentication

The ALC supports the IEEE 802.1x standard for centralized user authentication and accounting management through an optional network authentication (RADIUS) server.

Port Isolation

The ALC's port isolation feature allows each port to communicate with the uplink port but not communicate with each other. This option is the most limiting but also the most secure.

Isolation (per-VLAN)

Use isolation to block the DSL subscribers in a specific VLAN from sending traffic directly to each other.

Packet Filter

The ALC supports packet filtering based on protocol. You can configure the ALC to accept all packets, accept PPPoE packets only or block any combination of the following protocols: IP, ARP, DHCP, EAPOL, PPPoE, NetBios or IGMP.

MAC (Media Access Control) Filters

Use the MAC filter to filter incoming frames based on MAC (Media Access Control) address(es) or the OUI (Organizational Unit Identifier) that you specify. You may enable/disable the MAC filter on specific ports. You may specify up to ten MAC addresses per port.

MAC (Media Access Control) Count Limit

You can limit the number of MAC addresses that may be dynamically learned on a port. You may enable/disable the MAC count limit on individual ports.

IGMP Snooping

The ALC supports IGMP snooping enabling group multicast traffic to be only forwarded to ports that are members of that group; thus allowing you to significantly reduce multicast traffic passing through your ALC.

IGMP Filter

The IGMP filter defines multicast groups a port can join. You can create IGMP filter profiles which allow access to a multicast group, then assign the IGMP filter to a specific DSL port.

Multicast Group Limit

You can limit the number of IGMP multicast groups a subscriber on a port can join. You may enable/disable the multicast group limit on individual ports.

Discarding of IGMP Query Messages

The ALC discards IGMP query messages received from subscriber ports. This prevents subscribers from hosting IGMP multicast servers.

IGMP Statistics

The ALC records the number of active users in an IGMP multicast channel (multicast group). The ALC also records IGMP message statistics on a per port basis to ease management and troubleshooting.

IGMP Message Rate Limiting

The ALC can limit how many IGMP message packets a subscriber can send per second. This prevents subscribers from flooding the multicast server.

DLS Bonding (G.bond)

Bond two DSL ports for higher throughput. Packets can still pass through a single line if one of the links goes down.

Static Multicast

Use static multicast to allow incoming frames based on multicast MAC address(es) that you specify. This feature can be used in conjunction with IGMP snooping to allow multicast MAC address(es) that are not learned by IGMP snooping. You can use static multicast to pass routing protocols, such as RIP and OSPF.

Multicast Bandwidth Control

The ALC supports static bandwidth control for multicast traffic. Bandwidth limits can be assigned to multicast channels. During IGMP snooping, the system checks the total bandwidth usage to see if it exceeds the specified limit. If the specified limits are reached, the system restricts the joining of multicast groups.

DHCP Relay

DHCP (Dynamic Host Configuration Protocol RFC 2131 and RFC 2132) allows individual computers to obtain TCP/IP configuration at start-up from a server. You can configure the system as a DHCP relay agent to have another DHCP server provide TCP/IP configuration for the clients. In addition, you can set the system to forward client DHCP requests to specific DHCP servers based on the VLAN ID. You can also specify up to two DHCP servers for each VLAN to provide failover protection.

DHCP Relay Option82

The system supports DHCP relay agent82 (RFC 3046) that adds additional information to client DHCP requests that the MSC relays to a DHCP server. It also supports adding the sub-option 2 (Remote ID) with additional information.

DHCP Snooping

DHCP snooping allows the system to identify packets with DHCP server assigned IP address(es) and block access of devices using unknown IP addresses on a subscriber port. You can also manually add static IP addresses to the DHCP snooping table.

System Error Logging

The system error log will record error logs locally to the management switch card memory.

Remote Firmware Upgrade

You can use FTP or SFTP to perform configuration backup/restore and firmware upgrade from a remote location.

Anti-IP Address Spoofing

With DHCP snooping, the ALC records which IP addresses are assigned on each port. The ALC drops packets from a device using a different IP address.

Anti-MAC Address Spoofing

The ALC checks to make sure the MAC addresses of the devices connected to the DSL ports are not the same as MAC addresses of devices connected to the Ethernet network. This protects the network from disruptions of service caused by subscriber devices spoofing the MAC address of ISP servers.

Multiple PVC and ATM QoS

The ALC allows you to use different channels (also called Permanent Virtual Circuits or PVCs) for different services or subscribers. Define channels on each DSL port for different services or levels of service and assign each channel a priority. ATM Quality of Service (QoS) allows you to regulate the average rate and fluctuations of data transmission. This helps eliminate congestion to allow the transmission of real time data (such as audio and video).

Priority-based PVCs

The system provides Priority-based PVCs (PPVCs) to give different priorities to PVCs that are members of the same VLAN. Use up to eight priority queues for the member PVCs. The system maps frames with certain IEEE 802.1p priorities to a PVC with a particular priority queue.

PPPoA-to-PPPoE (PAE) PVC

This feature allows the system to translate PPPoA packets to PPPoE packets (and vice versa) to allow communication between CPE clients and an access concentrator (such as a BRAS) through the switch.

PPPoE Intermediate Agent Information

Similar to DHCP relay option82, you can set the system to insert line information into client PPPoE Discover Initialization (PODI) packets. This allows a PPPoE termination server to identify and authenticate a PPPoE client.

Transparent LAN Service (TLS)

Use TLS (also known as VLAN stacking) to add an outer VLAN tag to the inner IEEE 802.1Q tagged frames that enter the network. By tagging the tagged frames (“double-tagged” frames), the service provider can manage up to 4,094 VLAN groups with each group containing up to 4,094 customer VLANs. This allows a service provider to provide different services based on specific VLANs, for many different customers.

IP-aware Bridging

The line cards can forward frames based on the destination IP address, instead of the destination MAC address, and replace the source MAC address with its own MAC address. This provides better scalability and security for large-scale access networks, especially with Ethernet.

Classifier and Policy

You can create a policy to define actions to be performed on a PVC traffic flow grouped by a classifier according to specific criteria such as the IP address, port number or protocol type, and so on.

Single End Loop Test (SELT)

This feature checks the distance to an ADSL subscriber's location.

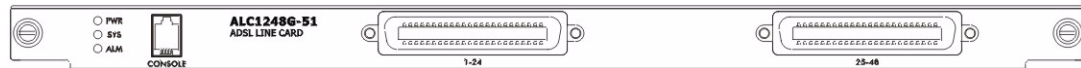
Double End Loop Test (DELT)

This feature (also called a Loop Diagnostic Mode test or LDM test) provides details about the condition of an ADSL subscriber's line.

1.4 Front Panel

The figure below shows the front panel of the ALC.

Figure 1 Front Panel



1.5 Ports and LEDs

These are the details of the ALC1248G ports and LEDs.

1.5.1 Ports

The following table describes the port labels on the front panel.

Table 2 Front Panel Ports

LABEL	DESCRIPTION
CONSOLE	For troubleshooting purposes, this mini RJ-11 port connects to a computer when the line card is not manageable from the MSC.
1-24, 25-48	These Telco-50 connectors are for connecting the ALC to the splitter cards.

1.5.2 LEDs

The following table describes the LED indicators on the front panel of the ALC.

Table 3 LED Descriptions

LED	COLOR	STATUS	DESCRIPTION
PWR	Green	On	The line card is turned on.
		Off	The line card is off.
SYS	Green	Blinking	The line card is rebooting and performing self-diagnostic tests.
		On	The line card is on and functioning properly.
		Off	The power is off or the line card is malfunctioning.
ALM	Red	On	There is a hardware failure or an alarm.
		Off	The line card is functioning normally.

1.6 Default Settings

Refer to your MSC user's guide for information on default settings.

Product Specifications

This chapter gives details about the line card hardware and features.

2.1 Product Specifications

Table 4 Device Specifications

Dimensions	390.6 mm (W) x 231.0 mm (D) x 24.0 mm (H)
Weight	0.5 kg
Interface	<ul style="list-style-type: none"> Two Telco-50 connectors: 48 ADSL Ports One mini RJ11 console port for local management
MAC Address Table	Up to 16K entries
Max. Number of IGMP Filter Profiles	128
Operation Temperature	-40° C ~ 65° C
Storage Temperature	-40° C ~ 70° C
Operation Humidity	10% ~ 90% RH (non-condensing)
Storage Humidity	10% ~ 95% RH (non-condensing)
ADSL Compliance	Multi-Mode ADSL Standard <ul style="list-style-type: none"> DMT T1.413, issue 2 G.DMT (ITU G.992.1) Annex A G.DMT (ITU G.992.1) Annex B G.LITE (ITU G.992.2) ADSL2 <ul style="list-style-type: none"> G.992.3 Annex A G.992.3 Annex B G.992.3 Annex L G.992.3 Annex M ADSL2+ <ul style="list-style-type: none"> G.992.5 Annex A G.992.5 Annex B G.992.5 Annex M

Table 4 Device Specifications

Certifications	CE Conformity FCC ITU-T K.20 Safety IEC 60950-1 EN 60950-1 CSA 60950-1 UL 60950-1 EMC EN 300386 EN 55022 EN 61000-3-2 EN 61000-3-3 EN 55024
Other Features	<ul style="list-style-type: none"> • DLS Bonding (G.bond) • Anti-IP Address Spoofing • Anti-MAC Address Spoofing • MAC Filtering • MAC Count Limiting • Hardware-based Multicasting • Multicast Group Limit • IGMP Message Rate Limiting • IEEE 802.1Q VLAN Tagging • GVRP • IEEE 802.1p CoS with Priority Queuing • IEEE 802.1w RSTP • IEEE 802.1s MSTP • IGMP v1 & v 2 Snooping • DHCP Relay Option82 • DHCP Snooping • IEEE 802.1x Port-based Authentication • PPPoA-PPPoE PVC • SELT (Single End Loop Test) • ACL profile

This table lists the standards the ALC supports.

Table 5 Supported Standards

STANDARD	DESCRIPTION
RFC 867	Daytime protocol
RFC 868	Time protocol
RFC 1305	Network Time Protocol (NTP)
RFC 1112	Internet Group Multicast Protocol (IGMP)
RFC 2236	IGMP v2
RFC 3376	IGMP v3
RFC 1213	Simple Network Management Protocol (SNMP)
RFC 1573	
RFC 1757	
RFC 2662	
RFC 2674	
RFC 2863	
RFC 3440	
RFC 3635	
RFC 3636	

Table 5 Supported Standards (continued)

STANDARD	DESCRIPTION
RFC 1483	Multiprotocol Encapsulation over ATM Adaptation Layer 5
RFC 2131 RFC 2132 RFC 3046	Dynamic Host Configuration Protocol (DHCP)
RFC 2138 RFC 2139	Remote Authentication Dial In User Service (RADIUS)
RFC 2486	Extensible Authentication Protocol (EAP)
RFC 2684	LLC and VC MUX Bridging
IEEE 802.1d	Transparent Bridging
IEEE 802.1p	Layer 2 Traffic Prioritization
IEEE 802.1Q	Virtual Local Area Network (VLAN)
IEEE 802.1x	Network Authentication

2.2 Firmware Naming Conventions

A firmware version includes the model code and release number as shown in the following example.

Firmware Version: V3.90(ABD.0), V3.90(ABE.0)

"ABD" or "ABE" is the model code.

- "ABD" denotes the ALC1248G-51 for ADSL over POTS (Annex A).
- "ABE" denotes the ALC1248G-53 for ADSL over ISDN (Annex B).

"0" is this firmware's release number. This varies as new firmware is released. Your firmware's release number may not match what is displayed in this User's Guide.

2.3 Telco-50 Connector Pin Assignments

The following figures and table describe the pin assignments for the ALC's Telco-50 connectors. The splitter card's Telco-50 connector and the USER and CO hardware Telco-50 connectors on the rear panel of the splitter chassis also use the same pin assignments.

Figure 2 ALC Ports 1-24 Telco-50 Connector Pin Assignments

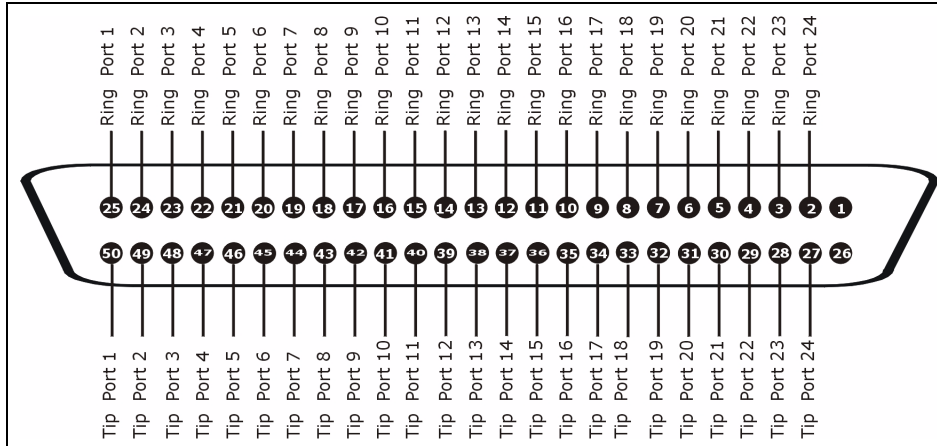


Figure 3 ALC Ports 25-48 Telco-50 Connector Pin Assignments

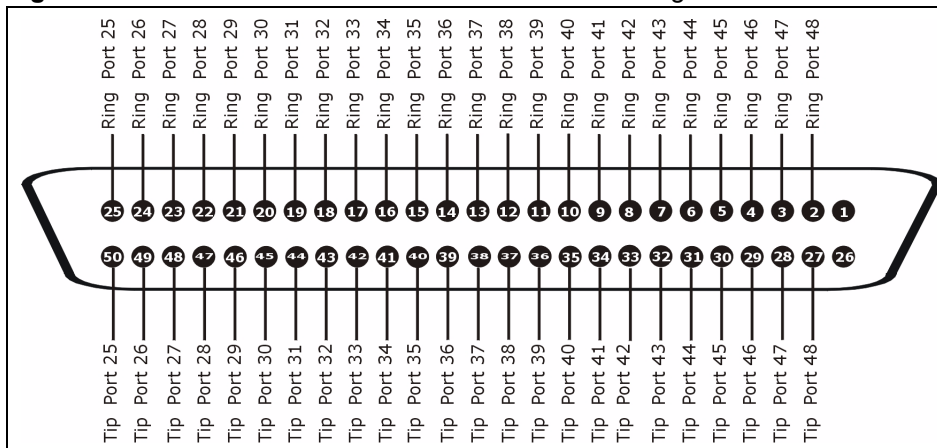


Table 6 ALC Telco-50 Connector Pin Assignments

PORTS 1-24 (FIRST TELCO-50 CONNECTOR)				PORTS 25-48 (SECOND TELCO-50 CONNECTOR)			
Pin 1	NULL	Pin 26	NULL	Pin 1	NULL	Pin 26	NULL
Pin 2	Ring Port 24	Pin 27	Tip Port 24	Pin 2	Ring Port 48	Pin 27	Tip Port 48
Pin 3	Ring Port 23	Pin 28	Tip Port 23	Pin 3	Ring Port 47	Pin 28	Tip Port 47
Pin 4	Ring Port 22	Pin 29	Tip Port 22	Pin 4	Ring Port 46	Pin 29	Tip Port 46
Pin 5	Ring Port 21	Pin 30	Tip Port 21	Pin 5	Ring Port 45	Pin 30	Tip Port 45
Pin 6	Ring Port 20	Pin 31	Tip Port 20	Pin 6	Ring Port 44	Pin 31	Tip Port 44
Pin 7	Ring Port 19	Pin 32	Tip Port 19	Pin 7	Ring Port 43	Pin 32	Tip Port 43
Pin 8	Ring Port 18	Pin 33	Tip Port 18	Pin 8	Ring Port 42	Pin 33	Tip Port 42

Table 6 ALC Telco-50 Connector Pin Assignments (continued)

PORTS 1-24 (FIRST TELCO-50 CONNECTOR)				PORTS 25-48 (SECOND TELCO-50 CONNECTOR)			
Pin 9	Ring Port 17	Pin 34	Tip Port 17	Pin 9	Ring Port 41	Pin 34	Tip Port 41
Pin 10	Ring Port 16	Pin 35	Tip Port 16	Pin 10	Ring Port 40	Pin 35	Tip Port 40
Pin 11	Ring Port 15	Pin 36	Tip Port 15	Pin 11	Ring Port 39	Pin 36	Tip Port 39
Pin 12	Ring Port 14	Pin 37	Tip Port 14	Pin 12	Ring Port 38	Pin 37	Tip Port 38
Pin 13	Ring Port 13	Pin 38	Tip Port 13	Pin 13	Ring Port 37	Pin 38	Tip Port 37
Pin 14	Ring Port 12	Pin 39	Tip Port 12	Pin 14	Ring Port 36	Pin 39	Tip Port 36
Pin 15	Ring Port 11	Pin 40	Tip Port 11	Pin 15	Ring Port 35	Pin 40	Tip Port 35
Pin 16	Ring Port 10	Pin 41	Tip Port 10	Pin 16	Ring Port 34	Pin 41	Tip Port 34
Pin 17	Ring Port 9	Pin 42	Tip Port 9	Pin 17	Ring Port 33	Pin 42	Tip Port 33
Pin 18	Ring Port 8	Pin 43	Tip Port 8	Pin 18	Ring Port 32	Pin 43	Tip Port 32
Pin 19	Ring Port 7	Pin 44	Tip Port 7	Pin 19	Ring Port 31	Pin 44	Tip Port 31
Pin 20	Ring Port 6	Pin 45	Tip Port 6	Pin 20	Ring Port 30	Pin 45	Tip Port 30
Pin 21	Ring Port 5	Pin 46	Tip Port 5	Pin 21	Ring Port 29	Pin 46	Tip Port 29
Pin 22	Ring Port 4	Pin 47	Tip Port 4	Pin 22	Ring Port 28	Pin 47	Tip Port 28
Pin 23	Ring Port 3	Pin 48	Tip Port 3	Pin 23	Ring Port 27	Pin 48	Tip Port 27
Pin 24	Ring Port 2	Pin 49	Tip Port 2	Pin 24	Ring Port 26	Pin 49	Tip Port 26
Pin 25	Ring Port 1	Pin 50	Tip Port 1	Pin 25	Ring Port 25	Pin 50	Tip Port 25

The following graphics show pin assignments for the Telco-50 connectors on the cables that connect the ALC to a splitter card in the splitter chassis. The pin assignments for ports 25-48 follow the same pattern as the pin assignments for ports 1-24.

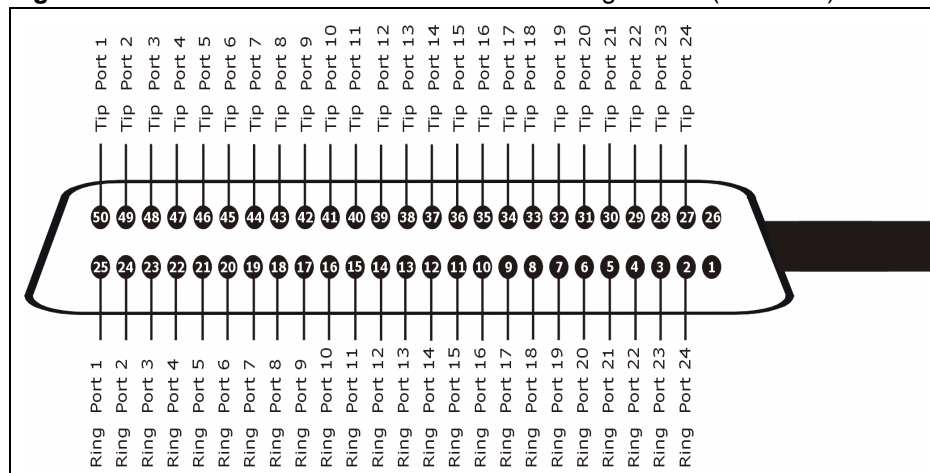
Figure 4 IES-5000/5005 Cable Telco-50 Pin Assignments (ALC End)

Figure 5 IES-5000/5005 Cable Telco-50 Pin Assignments (Splitter Card End)

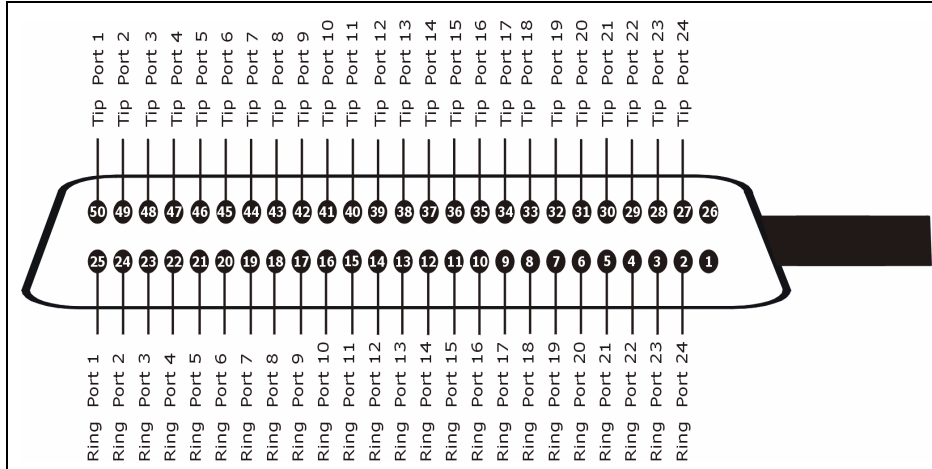


Figure 6 IES-6000 Cable Telco-50 Pin Assignments (ALC End)

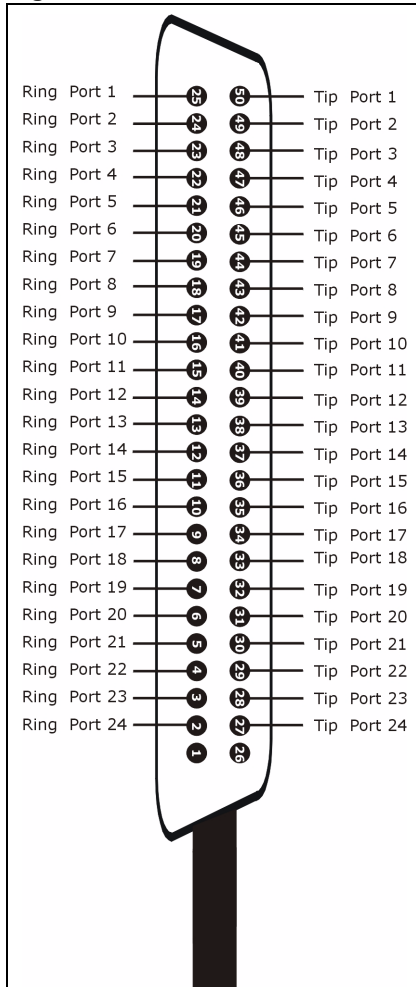
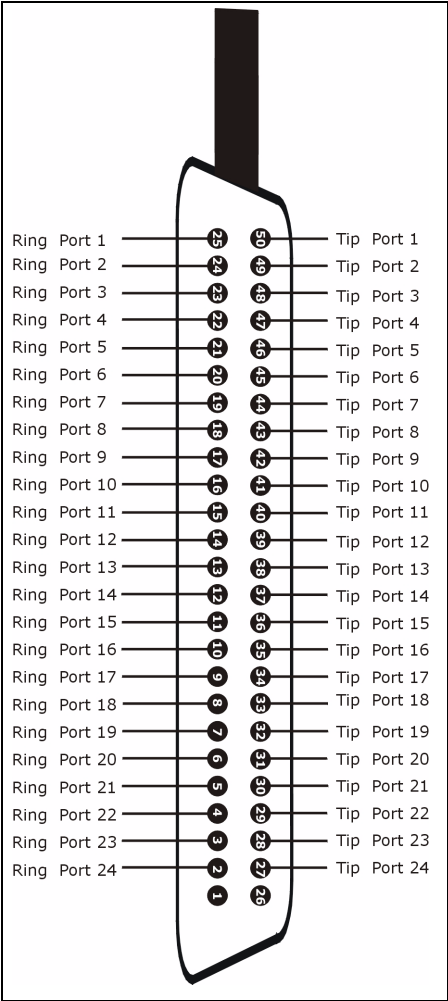


Figure 7 IES-6000 Cable Telco-50 Pin Assignments (Splitter Card End)



2.4 Wire Gauge Specifications

AWG (American Wire Gauge) is a measurement system for wire that specifies its thickness. As the thickness of the wire increases, the AWG number decreases.

Table 7 Wire Gauge Specifications

WIRE TYPE	REQUIRED AWG NO. (DIAMETER)
Telephone Wire	26 or larger

2.5 Console Cable Pin Assignments

The following diagram and chart show the pin assignments of the console cable.

Figure 8 Console Cable Mini RJ-11 Male Connector

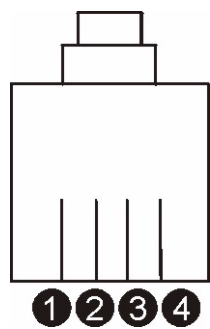


Table 8 Console Cable Connector Pin Assignments

MINI RJ-11 MALE
Pin 2: TXD
Pin 3: RXD
Pin 4: GND

Troubleshooting

This chapter offers some suggestions to solve problems you might encounter. The potential problems are divided into the following categories.

- [Power and LEDs](#)
- [DSL Data Transmission](#)
- [Local Server](#)
- [Data Rate](#)
- [Management and Configuration](#)

3.1 Power and LEDs



The SYS or PWR LED does not turn on.

Table 9 SYS LED Troubleshooting

STEPS	CORRECTIVE ACTION
1	Make sure the power wires are properly connected to the power supply and the power supply is operating normally. Make sure you are using the correct power source (refer to the IES User's Guide).
2	Make sure the power wires are connected properly.
3	Make sure the line card is properly installed.
4	The LED itself or the unit may be faulty; contact your vendor.



The ALM LED is on.

The **ALM** (alarm) LED lights when the line card is overheated or the voltage readings are outside the tolerance levels.

Table 10 ALM LED Troubleshooting

STEPS	CORRECTIVE ACTION
1	Use the <code>sys monitor status</code> command to verify the cause of the alarm. See step 2 if the unit is overheated, and step 3 if the voltages are out of the allowed ranges.
2	Ensure that the IES is installed in a well-ventilated area and that normal operation of the fans is not inhibited. Keep the bottom, top and all sides clear of obstructions and away from the exhaust of other equipment.
3	If the voltage levels are outside the allowed range, take a screen shot of the <code>sys monitor status</code> command display and contact your vendor.

3.2 DSL Data Transmission



The DSL link is up, but data cannot be transmitted.

Table 11 DSL Data Transmission Troubleshooting

STEPS	CORRECTIVE ACTION
1	Check the line card's port isolation settings. Check to see that the VPI/VCI and multiplexing mode (LLC/VC) settings in the subscriber's DSL modem or router match those of the DSL port. If the subscriber is having problems with video or other high-bandwidth services, make sure the line card's DSL port's data rates are set high enough.
2	Check the VLAN configuration.
3	Ping the MSC from the computer behind the DSL modem or router. If you cannot ping, connect a DSL modem to a DSL port (that is known to work). If the DSL modem or router works with a different DSL port, there may be a problem with the original port. Contact the distributor. If using a different port does not work, try a different DSL modem or router with the original port.

3.3 Local Server



The computer behind a DSL modem or router cannot access a local server connected to the line card.

Table 12 Local Server Troubleshooting

STEPS	CORRECTIVE ACTION
1	Refer to Section 3.2 on page 30 to make sure that the subscriber is able to transmit to the line card.
2	Make sure the computer behind the DSL device has the correct gateway IP address configured.
3	Check the VLAN configuration (refer to the MSC User's Guide).
4	Check the cable and connections between the line card and the local server.
5	Try to access another local server. If data can be transmitted to a different local server, the local server that could not be accessed may have a problem.

3.4 Data Rate



The SYNC-rate is not the same as the configured rate.

Table 13 SYNC-rate Troubleshooting

STEPS	CORRECTIVE ACTION
1	Connect the DSL modem or router directly to the DSL port using a different telephone wire.
2	If the rates match, the quality of the telephone wiring that connects the subscriber to the DSL port may be limiting the speed to a certain rate. If they do not match when a good wire is used, contact the distributor.

3.5 Management and Configuration



The line card is not manageable.

The line card always uses the default configuration. Any changes you made to the line card are stored on the MSC. By default, the MSC is allowed to manage every line card. Use the `lcm show` command on the MSC to see a line card's connection status. If you still cannot manage the line card from the MSC, the line card's configuration file may be damaged or the firmware may be old, you may need to restore the default configuration file or upload new firmware using the line card's console port.



The MSC resets the line card after a period of inactivity on the line card. This may damage the line card if you are uploading the default configuration file or new firmware to the line card. Use the `lcman disable <slot>` command on the MSC to prevent the MSC from managing the line card.

After you upload the file successfully, use the `lcman enable <slot>` command on the MSC to allow the MSC to manage the line card again. Refer to the MSC User's Guide for details about commands.

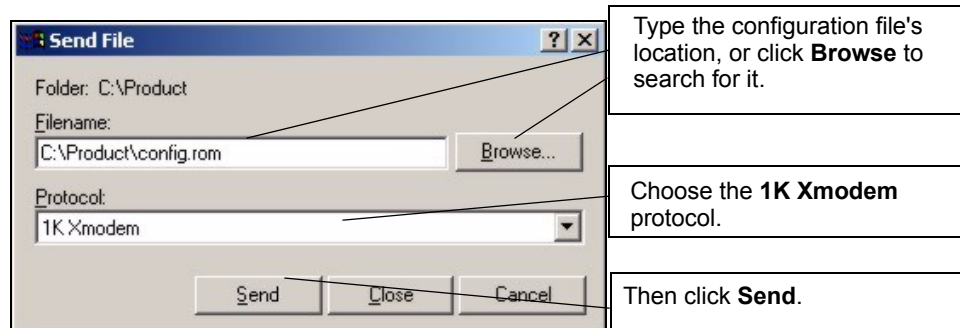
3.5.1 Uploading the Default Configuration File via Boot Commands

Obtain the default configuration file, unzip it and save it in a folder. Use a console cable to connect a computer with terminal emulation software to the line card's console port. Pull out the line card and push it back in, you will see the initial screen. When you see the message `Press any key to enter Debug Mode within 3 seconds press any key to enter debug mode.`

To upload the configuration file, do the following:

- 1 Type `atlc` after the `Enter Debug Mode` message.
- 2 Wait for the `Starting XMODEM upload` message before activating XMODEM upload on your terminal.
- 3 This is an example Xmodem configuration upload using HyperTerminal. Click **Transfer**, then **Send File** to display the following screen.

Figure 9 Example Xmodem Upload



- 4 After a successful configuration file upload, type `atgo` to restart the line card.

```

Bootbase Version: V1.00 | 03/23/2005 16:10:06
FLASH: AMD 32M
Hardware Version:
Serial Number:
RAM: Size = 133120 Kbytes

ZyNOS Version: V3.50(ABE.0)b3 | 05/11/2005 11:56:26

Press any key to enter debug mode within 3 seconds.
.....
Enter Debug Mode
atlc
Starting XMODEM upload (CRC mode)....
CCCC
Total 393216 bytes received.

Erasing...
.....
.....OK

atgo

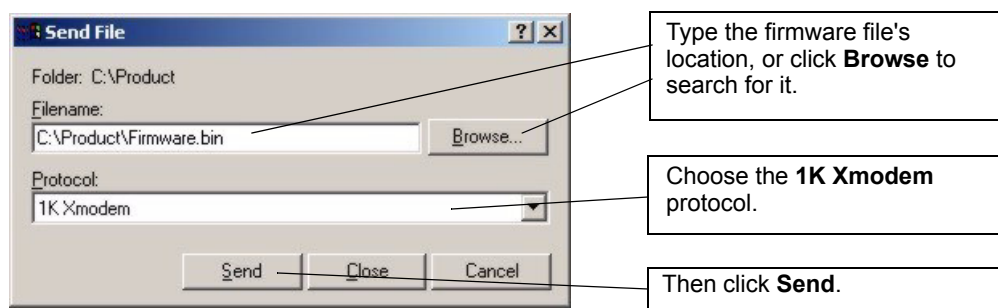
```

3.5.2 Uploading the Firmware via Boot Commands

Usually you should use FTP with the MSC to upload the line card's firmware. If you cannot manage the line card from the MSC, use the following procedure to upload firmware to the line card.

- 1 Obtain the firmware file, unzip it and save it in a folder on your computer.
- 2 Connect your computer to the console port and use terminal emulation software configured to the following parameters:
 - VT100 terminal emulation
 - 9600 bps
 - No parity, 8 data bits, 1 stop bit
 - No flow control
- 3 Pull out the line card and push it back in to restart it and begin a session.
- 4 When you see the `Press any key to enter Debug Mode within 3 seconds` message, press a key to enter debug mode.
- 5 Type `atba5` after the `Enter Debug Mode` message (this changes the console port speed to 115200 bps).
- 6 Change the configuration of your terminal emulation software to use 115200 bps and reconnect to the line card.
- 7 Type `atur` after the `Enter Debug Mode` message.
- 8 Wait for the `Starting XMODEM upload` message before activating XMODEM upload on your terminal.
- 9 This is an example Xmodem configuration upload using HyperTerminal. Click **Transfer**, then **Send File** to display the following screen.

Figure 10 Example Xmodem Upload



10 After a successful firmware upload, the line card restarts. The console port speed automatically changes back to 9600 bps when the line card restarts.

[illegible]

Legal Information

Copyright

Copyright © 2008 by ZyXEL Communications Corporation.

The contents of this publication may not be reproduced in any part or as a whole, transcribed, stored in a retrieval system, translated into any language, or transmitted in any form or by any means, electronic, mechanical, magnetic, optical, chemical, photocopying, manual, or otherwise, without the prior written permission of ZyXEL Communications Corporation.

Published by ZyXEL Communications Corporation. All rights reserved.

Disclaimer

ZyXEL does not assume any liability arising out of the application or use of any products, or software described herein. Neither does it convey any license under its patent rights nor the patent rights of others. ZyXEL further reserves the right to make changes in any products described herein without notice. This publication is subject to change without notice.

Trademarks

ZyNOS (ZyXEL Network Operating System) is a registered trademark of ZyXEL Communications, Inc. Other trademarks mentioned in this publication are used for identification purposes only and may be properties of their respective owners.

Certifications

Federal Communications Commission (FCC) Interference Statement

This device complies with Part 15 of FCC rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operations.

FCC Warning

This device has been tested and found to comply with the limits for a Class A digital switch, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a commercial environment. This device generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this device in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE Mark Warning:

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Taiwanese BSMI (Bureau of Standards, Metrology and Inspection) A Warning:

警告使用者
這是甲類的資訊產品，在居住的環境使用時，
可能造成射頻干擾，在這種情況下，
使用者會被要求採取某些適當的對策。

Notices

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

Viewing Certifications

- 1 Go to <http://www.zyxel.com>.
- 2 Select your product on the ZyXEL home page to go to that product's page.
- 3 Select the certification you wish to view from this page.

ZyXEL Limited Warranty

ZyXEL warrants to the original end user (purchaser) that this product is free from any defects in materials or workmanship for a period of up to two years from the date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, ZyXEL will, at its discretion, repair or replace the defective products or components without charge for either parts or labor, and to whatever extent it shall deem necessary to restore the product or components to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal or higher value, and will be solely at the discretion of ZyXEL. This warranty shall not apply if the product has been modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions.

Note

Repair or replacement, as provided under this warranty, is the exclusive remedy of the purchaser. This warranty is in lieu of all other warranties, express or implied, including any implied warranty of merchantability or fitness for a particular use or purpose. ZyXEL shall in no event be held liable for indirect or consequential damages of any kind to the purchaser.

To obtain the services of this warranty, contact your vendor. You may also refer to the warranty policy for the region in which you bought the device at http://www.zyxel.com/web/support_warranty_info.php.

Registration

Register your product online to receive e-mail notices of firmware upgrades and information at www.zyxel.com for global products, or at www.us.zyxel.com for North American products.

Customer Support

In the event of problems that cannot be solved by using this manual, you should contact your vendor. If you cannot contact your vendor, then contact a ZyXEL office for the region in which you bought the device. Regional offices are listed below (see also http://www.zyxel.com/web/contact_us.php). Please have the following information ready when you contact an office.

Required Information

- Product model and serial number.
- Warranty Information.
- Date that you received your device.
- Brief description of the problem and the steps you took to solve it.

“+” is the (prefix) number you dial to make an international telephone call.

Corporate Headquarters (Worldwide)

- Support E-mail: support@zyxel.com.tw
- Sales E-mail: sales@zyxel.com.tw
- Telephone: +886-3-578-3942
- Fax: +886-3-578-2439
- Web: www.zyxel.com
- Regular Mail: ZyXEL Communications Corp., 6 Innovation Road II, Science Park, Hsinchu 300, Taiwan

China - ZyXEL Communications (Beijing) Corp.

- Support E-mail: cso.zycn@zyxel.cn
- Sales E-mail: sales@zyxel.cn
- Telephone: +86-010-82800646
- Fax: +86-010-82800587
- Address: 902, Unit B, Horizon Building, No.6, Zhichun Str, Haidian District, Beijing
- Web: <http://www.zyxel.cn>

China - ZyXEL Communications (Shanghai) Corp.

- Support E-mail: cso.zycn@zyxel.cn
- Sales E-mail: sales@zyxel.cn
- Telephone: +86-021-61199055
- Fax: +86-021-52069033

- Address: 1005F, ShengGao International Tower, No.137 XianXia Rd, Shanghai
- Web: <http://www.zyxel.cn>

Costa Rica

- Support E-mail: soporte@zyxel.co.cr
- Sales E-mail: sales@zyxel.co.cr
- Telephone: +506-2017878
- Fax: +506-2015098
- Web: www.zyxel.co.cr
- Regular Mail: ZyXEL Costa Rica, Plaza Roble Escazú, Etapa El Patio, Tercer Piso, San José, Costa Rica

Czech Republic

- E-mail: info@cz.zyxel.com
- Telephone: +420-241-091-350
- Fax: +420-241-091-359
- Web: www.zyxel.cz
- Regular Mail: ZyXEL Communications, Czech s.r.o., Modranská 621, 143 01 Praha 4 - Modrany, Česká Republika

Denmark

- Support E-mail: support@zyxel.dk
- Sales E-mail: sales@zyxel.dk
- Telephone: +45-39-55-07-00
- Fax: +45-39-55-07-07
- Web: www.zyxel.dk
- Regular Mail: ZyXEL Communications A/S, Columbusvej, 2860 Soeborg, Denmark

Finland

- Support E-mail: support@zyxel.fi
- Sales E-mail: sales@zyxel.fi
- Telephone: +358-9-4780-8411
- Fax: +358-9-4780-8448
- Web: www.zyxel.fi
- Regular Mail: ZyXEL Communications Oy, Malminkaari 10, 00700 Helsinki, Finland

France

- E-mail: info@zyxel.fr
- Telephone: +33-4-72-52-97-97
- Fax: +33-4-72-52-19-20
- Web: www.zyxel.fr
- Regular Mail: ZyXEL France, 1 rue des Vergers, Bat. 1 / C, 69760 Limonest, France

Germany

- Support E-mail: support@zyxel.de
- Sales E-mail: sales@zyxel.de
- Telephone: +49-2405-6909-69
- Fax: +49-2405-6909-99
- Web: www.zyxel.de
- Regular Mail: ZyXEL Deutschland GmbH., Adenauerstr. 20/A2 D-52146, Wuerselen, Germany

Hungary

- Support E-mail: support@zyxel.hu
- Sales E-mail: info@zyxel.hu
- Telephone: +36-1-3361649
- Fax: +36-1-3259100
- Web: www.zyxel.hu
- Regular Mail: ZyXEL Hungary, 48, Zoldlomb Str., H-1025, Budapest, Hungary

India

- Support E-mail: support@zyxel.in
- Sales E-mail: sales@zyxel.in
- Telephone: +91-11-30888144 to +91-11-30888153
- Fax: +91-11-30888149, +91-11-26810715
- Web: <http://www.zyxel.in>
- Regular Mail: India - ZyXEL Technology India Pvt Ltd., II-Floor, F2/9 Okhla Phase -1, New Delhi 110020, India

Japan

- Support E-mail: support@zyxel.co.jp
- Sales E-mail: zyp@zyxel.co.jp
- Telephone: +81-3-6847-3700
- Fax: +81-3-6847-3705
- Web: www.zyxel.co.jp
- Regular Mail: ZyXEL Japan, 3F, Office T&U, 1-10-10 Higashi-Gotanda, Shinagawa-ku, Tokyo 141-0022, Japan

Kazakhstan

- Support: <http://zyxel.kz/support>
- Sales E-mail: sales@zyxel.kz
- Telephone: +7-3272-590-698
- Fax: +7-3272-590-689
- Web: www.zyxel.kz
- Regular Mail: ZyXEL Kazakhstan, 43 Dostyk Ave., Office 414, Dostyk Business Centre, 050010 Almaty, Republic of Kazakhstan

Malaysia

- Support E-mail: support@zyxel.com.my
- Sales E-mail: sales@zyxel.com.my
- Telephone: +603-8076-9933
- Fax: +603-8076-9833
- Web: <http://www.zyxel.com.my>
- Regular Mail: ZyXEL Malaysia Sdn Bhd., 1-02 & 1-03, Jalan Kenari 17F, Bandar Puchong Jaya, 47100 Puchong, Selangor Darul Ehsan, Malaysia

North America

- Support E-mail: support@zyxel.com
- Support Telephone: +1-800-978-7222
- Sales E-mail: sales@zyxel.com
- Sales Telephone: +1-714-632-0882
- Fax: +1-714-632-0858
- Web: www.zyxel.com
- Regular Mail: ZyXEL Communications Inc., 1130 N. Miller St., Anaheim, CA 92806-2001, U.S.A.

Norway

- Support E-mail: support@zyxel.no
- Sales E-mail: sales@zyxel.no
- Telephone: +47-22-80-61-80
- Fax: +47-22-80-61-81
- Web: www.zyxel.no
- Regular Mail: ZyXEL Communications A/S, Nils Hansens vei 13, 0667 Oslo, Norway

Poland

- E-mail: info@pl.zyxel.com
- Telephone: +48-22-333 8250
- Fax: +48-22-333 8251
- Web: www.pl.zyxel.com
- Regular Mail: ZyXEL Communications, ul. Okrzei 1A, 03-715 Warszawa, Poland

Russia

- Support: <http://zyxel.ru/support>
- Sales E-mail: sales@zyxel.ru
- Telephone: +7-095-542-89-29
- Fax: +7-095-542-89-25
- Web: www.zyxel.ru
- Regular Mail: ZyXEL Russia, Ostrovityanova 37a Str., Moscow 117279, Russia

Singapore

- Support E-mail: support@zyxel.com.sg
- Sales E-mail: sales@zyxel.com.sg
- Telephone: +65-6899-6678
- Fax: +65-6899-8887
- Web: <http://www.zyxel.com.sg>
- Regular Mail: ZyXEL Singapore Pte Ltd., No. 2 International Business Park, The Strategy #03-28, Singapore 609930

Spain

- Support E-mail: support@zyxel.es
- Sales E-mail: sales@zyxel.es
- Telephone: +34-902-195-420
- Fax: +34-913-005-345
- Web: www.zyxel.es
- Regular Mail: ZyXEL Communications, Arte, 21 5ª planta, 28033 Madrid, Spain

Sweden

- Support E-mail: support@zyxel.se
- Sales E-mail: sales@zyxel.se
- Telephone: +46-31-744-7700
- Fax: +46-31-744-7701
- Web: www.zyxel.se
- Regular Mail: ZyXEL Communications A/S, Sjöporten 4, 41764 Göteborg, Sweden

Taiwan

- Support E-mail: support@zyxel.com.tw
- Sales E-mail: sales@zyxel.com.tw
- Telephone: +886-2-27399889
- Fax: +886-2-27353220
- Web: <http://www.zyxel.com.tw>
- Address: Room B, 21F., No.333, Sec. 2, Dunhua S. Rd., Da-an District, Taipei

Thailand

- Support E-mail: support@zyxel.co.th
- Sales E-mail: sales@zyxel.co.th
- Telephone: +662-831-5315
- Fax: +662-831-5395
- Web: <http://www.zyxel.co.th>
- Regular Mail: ZyXEL Thailand Co., Ltd., 1/1 Moo 2, Ratchaphruk Road, Bangrak-Noi, Muang, Nonthaburi 11000, Thailand.

Turkey

- Support E-mail: cso@zyxel.com.tr
- Telephone: +90 212 222 55 22
- Fax: +90-212-220-2526
- Web: <http://www.zyxel.com.tr>
- Address: Kaptanpasa Mahallesi Piyalepasa Bulvari Ortadogu Plaza N:14/13 K:6 Okmeydani/Sisli Istanbul/Turkey

Ukraine

- Support E-mail: support@ua.zyxel.com
- Sales E-mail: sales@ua.zyxel.com
- Telephone: +380-44-247-69-78
- Fax: +380-44-494-49-32
- Web: www.ua.zyxel.com
- Regular Mail: ZyXEL Ukraine, 13, Pimonenko Str., Kiev 04050, Ukraine

United Kingdom

- Support E-mail: support@zyxel.co.uk
- Sales E-mail: sales@zyxel.co.uk
- Telephone: +44-1344-303044, 0845 122 0301 (UK only)
- Fax: +44-1344-303034
- Web: www.zyxel.co.uk
- Regular Mail: ZyXEL Communications UK Ltd., 11 The Courtyard, Eastern Road, Bracknell, Berkshire RG12 2XB, United Kingdom (UK)

Index

A

ADSL Standards [13](#)
ALM LED [30](#)
American Wire Gauge [27](#)
ATM QoS [17](#)
AWG [27](#)

B

bandwidth control [16](#)

C

certifications [35](#), [36](#)
 notices [36](#)
 viewing [36](#)
classifier [18](#)
console port [33](#)
contact information [39](#)
copyright [35](#)
customer support [39](#)

D

default setting [19](#)
DHCP [16](#)
DHCP (Dynamic Host Configuration Protocol) [16](#)
DHCP Relay Option82 [16](#)
DHCP snooping [16](#)
disclaimer [35](#)
double-tagged frames [17](#)

E

error log [17](#)

F

FCC interference statement [35](#)
features [14](#)
filter protocols [15](#)
filter, packet [15](#)
front panel [18](#)

I

IEEE 802.1p Priority [14](#)
IEEE 802.1Q Tagged VLAN [14](#)
IEEE 802.1x Port-based Authentication [15](#)
isolation [15](#)

L

LEDs [19](#)
lockout [31](#)
log [17](#)

M

MAC count filter [15](#)
MAC filter [15](#)
multicast bandwidth control [16](#)
multicast group limit [15](#)
Multicast VLAN [15](#)
Multiple PVC [17](#)
MVLAN [15](#)

P

packet filter [15](#)
PAE [17](#)
pin assignments [24](#)

- policy [18](#)
- port isolation [15](#)
- PPPoA-to-PPPoE PVC [17](#)
- PPPoE Intermediate Agent Information [17](#)
- Priority-based PVC [17](#)
- product registration [37](#)
- protocol filter [15](#)
- PWR LED [29](#)

R

- recovering the firmware [33](#)
- registration
 - product [37](#)
- related documentation [3](#)

S

- safety warnings [5](#)
- standards, supported [22](#)
- static multicast [16](#)
- switch lockout [31](#)
- syntax conventions [4](#)
- SYS LED [29](#)
- system error log [17](#)

T

- Telco-50 connector pin assignments [27](#)
- Telco-50 pin assignments [24](#)
- telephone wire [27](#)
- terminal emulation [33](#)
- trademarks [35](#)
- Transparent LAN Service (TLS) [17](#)

U

- USER Telco-50 connectors [27](#)

V

- VLAN [30](#)
- VLAN Stacking [17](#)
- VLAN stacking [17](#)
- VT100 [33](#)

W

- warranty [36](#)
 - note [37](#)
- wire gauge [27](#)

X

- XMODEM upload [32](#), [33](#)